## **CLAIMS**

What is claimed is:

1. A mixture of reaction products of

$$x(Ti-(OR^{1})_{4}) + y(HO-R^{2}-OH) + z((HO)-C(R^{3})(R^{4})-W-C(R^{5})(R^{6})-(OH)),$$

the mixture being substantially free from di-functional diols other than HO-R<sup>2</sup>-OH, wherein

each R<sup>1</sup> is independently a C<sub>1</sub>-C<sub>10</sub> alkyl group;

R<sup>2</sup> is a C<sub>2</sub>-C<sub>6</sub> alkylene group;

each of R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, and R<sup>6</sup> is independently a hydrogen atom or a C<sub>1</sub>-C<sub>4</sub> alkyl group except that

at least one of  $R^3$  and  $R^4$  is a  $C_1$ - $C_4$  alkyl group, and at least one of  $R^5$  and  $R^6$  is a  $C_1$ - $C_4$  alkyl group;

W is an oxygen atom, a sulfur atom, a nitrogen-containing group, a phosphorus-containing group, or a  $C_1$ - $C_4$  alkylene group;

each of x and y is greater than 0; and

y > z.

- 2. The mixture of claim 1 wherein y = 2x z and each of x, y, z is a number greater than 0.
- 3. The mixture of claim 1 wherein z = 0 and y/x > 2.
- 4. The mixture of claim 1 where W is a  $C_1$ - $C_4$  alkylene group.
- 5. The mixture of claim 4 wherein  $R^1$  is an isopropyl group;  $R^2$  is a butylene group; each of  $R^3$ ,  $R^4$ , and  $R^5$  is a methyl group; and  $R^6$  is a hydrogen atom.
- 6. The mixture of claim 1 wherein the mixture of reaction products is substantially free from all mono- and di-functional alcohols.
- 7. A mixture of reaction products of

$$n(Ti\text{-}(OR^1)_4) + (2n\text{-}m)((HO\text{-}R^2\text{-}OH) + m((HO)\text{-}C(R^3)(R^4)\text{-}W\text{-}C(R^5)(R^6)\text{-}(OH)),$$

the mixture being substantially free from di-functional diols, wherein each  $R^1$  is independently a  $C_1$ - $C_{10}$  alkyl group;

 $R^2$  is a  $C_2$ - $C_6$  alkylene group;

each of  $R^3$ ,  $R^4$ ,  $R^5$ , and  $R^6$  is independently a hydrogen atom or a  $C_1$ - $C_4$  alkyl group except that

at least one of  $R^3$  and  $R^4$  is a  $C_1$ - $C_4$  alkyl group, and at least one of  $R^5$  and  $R^6$  is a  $C_1$ - $C_4$  alkyl group;

W is an oxygen atom, a sulfur atom, a nitrogen-containing group, a phosphoruscontaining group, or a C<sub>1</sub>-C<sub>4</sub> alkylene group; and each of m and n is greater than 0.

- 8. The mixture of claim 7 where W is a  $C_1$ - $C_4$  alkylene group.
- 9. The mixture of claim 7 wherein  $R^1$  is an isopropyl group.
- 10. The mixture of claim 7 wherein  $R^2$  is a butylene group.
- 11. The mixture of claim 7 wherein  $R^1$  is an isopropyl group;  $R^2$  is a butylene group; each of  $R^3$ ,  $R^4$ , and  $R^5$  is a methyl group;  $R^6$  is a hydrogen atom; and W is a methylene group.
- 12. The mixture of claim 7 wherein m/2n is between about 0.1 to about 0.5.
- 13. The mixture of claim 12 wherein m/2n is between about 0.15 to about 0.25.
- 14. The mixture of claim 7 further comprising an organic solvent.
- 15. The mixture of claim 7 wherein the mixture is obtained from a reaction conducted in an organic solvent.
- 16. The mixture of claim 15 wherein the organic solvent is a chlorohydrocarbon.
- 17. The mixture of claim 16 wherein the organic solvent is o-dichlorobenzene.
- 18. The mixture of claim 7 wherein the mixture of reaction products is substantially free from all mono- and di-functional alcohols.
- 19. A mixture of reaction products of

$$n(Ti-(OR^1)_4) + m(HO-R^2-OH),$$

wherein

each  $R^1$  is independently a  $C_1$ - $C_{10}$  alkyl group;  $R^2$  is a  $C_2$ - $C_6$  alkylene group; and

each of m and n is greater than 0, and m/n > 2.

20. The mixture of claim 19 wherein  $R^1$  is an isopropyl group.

- 21. The mixture of claim 19 wherein  $R^2$  is a butylene group.
- 22. The mixture of claim 19 wherein  $R^1$  is an isopropyl group and  $R^2$  is a butylene group.
- 23. The mixture of claim 19 wherein 5 > m/n > 3.
- 24. The mixture of claim 19 wherein the mixture is obtained from a reaction conducted without a solvent.
- 25. The mixture of claim 19 substantially free of all mono- and di-functional alcohols.
- 26. A method for depolymerizing a polyester comprising the step of contacting, in the presence of heat, a mixture comprising: a polyester, an organic solvent which is substantially free of oxygen and water, and the mixture of claim 1, to produce macrocyclic oligoesters substantially free from macrocyclic co-oligoesters.
- 27. The method of claim 26 wherein the polyester comprise poly(1,4-butylene terephthalate).
- 28. A method for depolymerizing a polyester comprising the step of contacting, in the presence of heat, a mixture comprising: a polyester, an organic solvent which is substantially free of oxygen and water, and the mixture of claim 7, to produce macrocyclic oligoesters substantially free from macrocyclic co-oligoesters.
- 29. A method for depolymerizing a polyester comprising the step of contacting, in the presence of heat, a mixture comprising: a polyester, an organic solvent which is substantially free of oxygen and water, and the mixture of claim 19, to produce macrocyclic oligoesters substantially free from macrocyclic co-oligoesters.